CLAIMS

1. A method for breaking a futile collection cycle in a train algorithm, wherein a collection-set includes at least the oldest car in the oldest train, the method comprising the steps of:

determining when a futile cycle has been entered,

identifying a car outside the collection-set in the oldest train, where the identified car contains an object referenced from outside the oldest train,

adding the identified car to the collection to form an augmented collection-set, and

collecting the augmented collection-set including scanning intervening cars.

2. The method of claim 1 further wherein the step of identifying includes the step of using information about the references to objects in cars in the oldest train collected during prior collections.

3. The method of claim 1 wherein the step of identifying includes the step of using information about the references to objects in cars in the oldest train collected during the current collection.

4. The method of claim 1 wherein the reference from outside the oldest train is a reference from a younger train.

5. The method of claim 1 wherein the reference from outside the oldest train is a reference from outside the generation.

6. The method of claim 1 wherein the step of determining comprises the steps of:

measuring the volume of the oldest train before a collection,

measuring the volume of the oldest train after a collection, wherein if no volume reduction has been found, a futile collection cycle has been entered.

7. The method of claim 6 further comprising the steps of:

establishing a threshold for the number of times that a collection cycle has resulted in no reduction in the volume of the collection set,

saving the number of times that a collection cycle has resulted in no reduction in the volume of the collection set, wherein when the threshold is reached a futile collection cycle has been entered.

8. The method of claim 7 further comprising the steps of:

tracking the number of times on a no progress counter that a collection cycle has resulted in no reduction in the volume of the oldest train, and

comparing the no progress counter to the threshold.

9. A garbage collector using the train algorithm, wherein a collection set includes at least the oldest car in the oldest train, and including means for breaking a futile cycle, the collector comprising:

means for determining when a futile cycle has been entered,

means for identifying a car outside the collection-set in the oldest train, where the identified car contains an object referenced from outside the oldest train,

means for adding the identified car to the collection to form an augmented collection-set, and

means for collecting the augmented collection-set including scanning intervening cars.

10. The garbage collector of claim 9 further wherein the means for identifying includes means for using information about the references to objects in cars in the oldest train collected during prior collections.

11. The garbage collector of claim 9 wherein the means for identifying includes means for using information about the references to objects in cars in the oldest train collected during the current collection.

12. The garbage collector of claim 9 wherein the reference from outside the oldest train is a reference from a younger train.

13. The garbage collector of claim 9 wherein the reference from outside the oldest train is a reference from outside the generation.

14. The collector of claim 9 wherein the means for determining comprises:
means for measuring the volume of the oldest train before a collection,
means for measuring the volume of the oldest train after a collection,
wherein if no volume reduction has been found, a futile collection cycle has been entered.

15. The collector of claim 14 further comprising:
means for establishing a threshold for the number of times that a collection cycle has resulted in no reduction in the volume of the collection set,
means for saving the number of times that a collection cycle has resulted in no reduction in the volume of the collection set, wherein when the threshold is reached a futile collection cycle has been entered.

16. The collector of claim 9 further comprising:
means for tracking the number of times on a no progress counter that a collection cycle has resulted in no reduction in the volume of the oldest train, and
means for comparing the no progress counter to the threshold.

17. A computer readable storage media comprising media containing instructions for execution in a processor for the practice of a method for breaking a futile collection cycle in a train algorithm, wherein a collection set includes at least the oldest car in the oldest train, the method comprising the steps of:
determining when a futile cycle has been entered,
identifying a car outside the collection-set in the oldest train, where the identified car contains an object referenced from outside the oldest train,

adding a found younger car to the collection to form an augmented collection set, and

collecting the augmented collection set.

18. The computer readable storage media of claim 17 further comprising media containing further instructions for the practice of a method comprising the step of identifying includes the step of using information about the references to objects in cars in the oldest train collected during prior collections.

19. The computer readable storage media of claim 17 further comprising media containing further instructions for the practice of a method comprising the step of identifying includes the step of using information about the references to objects in cars in the oldest train collected during the current collection.

20. The computer readable storage media of claim 17 wherein the reference from outside the oldest train is a reference from a younger train.

21. The computer readable storage media of claim 17 wherein the reference from outside the oldest train is a reference from outside the generation.

22. The computer readable storage media of claim 18 further comprising media containing further instructions for the practice of a method comprising steps of:

measuring the volume of the oldest train before a collection,

measuring the volume of the oldest train after a collection,

wherein if no volume reduction has been found, a futile collection cycle has been entered.

23. The computer readable storage media of claim 22 further comprising media containing further instructions for the practice of a method comprising steps of:

establishing a threshold for the number of times that a collection cycle has resulted in no reduction in the volume of the collection set,

saving the number of times that a collection cycle has resulted in no reduction in the volume of the collection set, wherein when the threshold is reached a futile collection cycle has been entered.

24. The computer readable storage media of claim 23 further comprising media containing further instructions for the practice of a method comprising steps of:

tracking the number of times on a no progress counter that a collection cycle has resulted in no reduction in the volume of the oldest train, and

comparing the no progress counter to the threshold.

25. Electromagnetic signals propagating on a computer network comprising electromagnetic signals carrying instructions to one or more processors for execution thereon for the practice of a method for breaking a futile collection cycle in a train algorithm, wherein a collection set includes at least the oldest car in the oldest train, the method comprising the steps of:

determining when a futile cycle has been entered,

identifying a car outside the collection-set in the oldest train, where the identified car contains an object referenced from outside the oldest train,

adding the identified car to the collection to form an augmented collection-set, and

collecting the augmented collection-set including scanning intervening cars.

26. The electromagnetic signals propagating on a computer network of claim wherein the step of identifying includes the step of using information about the references to objects in cars in the oldest train collected during prior collections.

27. The electromagnetic signals propagating on a computer network of claim wherein the step of identifying includes the step of using information about the references to objects in cars in the oldest train collected during the current collection.

28. The electromagnetic signals propagating on a computer network of claim wherein the reference from outside the oldest train is a reference from a younger train.

29. The electromagnetic signals propagating on a computer network of claim wherein the reference from outside the oldest train is a reference from outside the generation.

30. The electromagnetic signals propagating on a computer network of claim 25 further comprising electromagnetic signals carrying instructions for the steps of:

if no younger cars are found with objects referenced from younger trains, then finding and adding a car with an external reference to the collection set to form a second augmented collection set, and

collecting the second augmented collection set.

31. The electromagnetic signals propagating on a computer network of claim 25 further comprising electromagnetic signals carrying instructions for the steps of:

measuring the volume of the oldest train before a collection,

measuring the volume of the oldest train after a collection,

wherein if no volume reduction has been found, a futile collection cycle has been entered.

32. The electromagnetic signals propagating on a computer network of claim 31 further comprising electromagnetic signals carrying instructions for the steps of::

establishing a threshold for the number of times that a collection cycle has resulted in no reduction in the volume of the collection set,

saving the number of times that a collection cycle has resulted in no reduction in the volume of the collection set, wherein when the threshold is reached a futile collection cycle has been entered.

33. The electromagnetic signals propagating on a computer network of claim 25 further comprising electromagnetic signals carrying instructions for the steps of:

tracking the number of times on a no progress counter that a collection cycle has resulted in no reduction in the volume of the oldest train, and

comparing the no progress counter to the threshold.